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TECHNOLOGY NEWS

• *Compiled by Tony C. Liu, Ph.D., P.E.*

New Decontaminants on Horizon

Growing concerns about the potential for chemical and biological warfare in the fight against terrorism have spurred new research into decontaminant technology that would be non-corrosive, non-toxic, environmentally safe and universally available.

Decontamination solutions presently available include STB, a highly corrosive hypochlorite-based alkaline solution, and DS2, (diethylene triamine and ethylene glycol monomethyl ether, both considered toxic). In addition, these solutions are difficult to dispose of in an environmentally safe fashion.

Studies at the Air Force Research Laboratory (AFRL) at Tyndall AFB, Fla., are focusing on the use of dioxiranes – powerful oxidative agents that can be made simply and cheaply using non-hazardous materials in a water-based solution. Specifically, the AFRL's researchers are focusing on generating dioxirane-based decontaminants by combining aqueous solutions of Oxone (a peracid salt) in a bicarbonate buffered matrix with a ketone (e.g., acetone). The resulting solution is effective at a neutral, non-corrosive pH, and produces environmentally benign by-products of potassium sulfate and sodium carbonate. Results have shown rapid degradation of H- and V- chemical agent simulants as well as virus, bacteria, and spore biological simulants within minutes of exposure to in situ generated dioxirane. A modification to the formulation also has been shown to achieve degradation of the organophosphonate G-agent simulant. Conceptual generator and delivery design for large-body field application would involve a mixing drum with pump and spray apparatus, similar to that used with fire-fighting equipment. Preliminary material testing indicates no observable adverse effects upon application, other than slight softening of painted metal that quickly returned to hardness upon drying. Early studies also indicated that volatile dioxiranes provide the impetus to pursue possibilities of gaseous application for interior/sensitive equipment decontamination. *(Michael V. Henley, Tyndall AFB; (850) 283-6050 or Mike.Henley@tyndall.af.mil)*